

6 March 1967

To: [redacted]
From: [redacted]
Subject: Pressure Suits

Dear Ben:

I have looked into the problem you referred to regarding [redacted] use of a non-standard pressure suit while flying the SR-71. I have satisfied myself that his particular activities require the action he has taken.

The major problem involved is that he flies all types of our aircraft [redacted] EAFB and Palmdale. In addition, he is evaluating what I consider to be a very important modification to the helmet which provides the only real answer I know of to the night glare problem. Several years ago we developed the use of a separate oxygen mask in conjunction with an automatic visor so that the pilot would have the helmet completely enclosed only in an emergency. I strongly recommend this improvement for all suits in use. Certainly the pilots at Beale who will engage in night refuelings would find definite benefit from this device.

Following is a summary concerning [redacted] pressure suit requirements and experience:

1. He has two custom-made rear-entry full pressure pilot's protective assemblies (the rubberized garments), Type GN-S970; two helmet assemblies, Type GN-ACS-380 (face seal type helmets), which he used for several years but does not now use; two helmet assemblies, Phase II (oxygen-mask type helmet), which he has used for the past year and a half; two aluminized HT outer garments (non-integrated), which he uses while flying the A-12, YF-12A or SR-71, serials #2016 and earlier; one aluminized HT outer garment (special), integrated harness type, for use on SR-71's #2017 and subsequent; two pair of custom gloves; and one pair of standard gloves, Type K, which he now uses with any of the above configurations of full pressure suits.

2. In August 1965, through []'s coordination, Lockheed acquired for the project at [] six of the helmet assemblies, Phase II, for experimental purposes, with a view toward improving upon the earlier helmet assemblies, the principal deficiencies cited by the pilots being glare off the faceplate, and too much heat, especially at high speeds. A few of the pilots have tried the new arrangement, but only Mr. [] have extensive experience with both systems. [] has used this system exclusively for over one and a half years. Both pilots are strongly convinced that the Phase II helmet arrangement is superior.

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3. At present, one of [] Phase II helmets is at the PSD (Physiological Support Division) at Edwards Air Force Base, together with most of his other pressure suit equipment. The other Phase II helmet is at present at the PSD at Beale AFB undergoing a modification of the suspension system by [] USAF. Most of the Beale AFB pilots have had [] modify their helmets, and I am told that the David Clark Company agrees that this modification of the suspension system is a substantial improvement upon the David Clark suspension system. Mr. [] has not flown this latest modification, but many of the Beale pilots have and they assert it to be much superior.

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4. [] has a special aluminized HT outer garment, integrated harness type, since it was much more economical to use the same rubberized garments (Type GN-970) for the integrated harness type of aircraft as with the earlier aircraft. Irrespective of the type of ejection seat, the same rubberized garment, custom, may be used; only the aluminized HT outer garment need be changed. This outer garment, integrated harness type, has a special pocket in the inboard side of the left lower leg, which change was approved by the SPO. The reason for this is that, for tall pilots, the lower forward left leg pocket is apt to actuate the restart switches (particularly on the YF-12A), and Mr. [] wished to evaluate this proposed modification in the location of the pocket. I am advised that [] Edwards AFB, would wrap tape around his leg to prevent possible inadvertent actuation of switches. [] was the first pilot to fly and evaluate the integrated harness, stabilized seat cockpit arrangement.

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5. [] has not in recent months found it necessary to carry the pressure suit in the trunk of his car. This requirement arose because it was necessary, on very short notice, to fly in the Edwards-Palmdale area, [] If some item of the pressure suit is under repair, or back at the factory, then having only one pressure suit available, to avoid setting up special aircraft to transport the suit back and forth between locations, the best solution was deemed to be to

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carry it in the trunk of the car, in the special David Clark container, in order to be able to cover flights on very short notice in either location.

6. Since the Phase II type helmet is a special arrangement, I have asked the David Clark Company to write a letter outlining the precise checkout procedure recommended to be forwarded to the PSD (Physiological Support Division) at Edwards Air Force Base.

7. [] comments on the merits of the Phase II system (oxygen mask type helmet) are as follows:

a. It is much superior to the old system. It takes awhile to get used to it, but he feels that if this system, rather than the face seal system, had been used earlier, instead of the other way around, it would have been very difficult to persuade the pilots to use the face seal system. By far the biggest advantage of the Phase II system is the elimination of glare, both for day and night flying, which is a constant source of irritation and annoyance, and the elimination of the tendency toward claustrophobia when enveloped behind the face plate. In short, it is as comfortable and convenient as the low altitude flying suit arrangement, such as for flying the T-33.

b. The second major advantage of the Phase II helmet is that the pilot is cooler, especially at high speed. The pilot's face is in closest proximity to the uninsulated side windows which are the worst source of radiation, and, with the face plate down, the face heat from the visor supplements the radiation and the vent air goes overboard at the regulator, at the right abdomen. With the Phase II system, the visor is up, there is no heating of the pilot by the visor heating system, and, most important, the vent air finds the path of least resistance to be around the neck and open face of the helmet, thus cooling the pilot in the otherwise unvented face area.

c. In addition, since glare is no longer a problem, the black sunshade may be placed between the pilot's face and that part of the windshield which is closest, to block radiation. In the event of rapid decompression, the aneroid device snaps shut at cabin pressure of 30,000 feet. At very high altitude unstarts this has occurred frequently, with perfect automatic operation. After the unstart is cleared, and cabin pressure regained, the visor may be raised and the aneroid recocked, as initially.

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d. The importance of the elimination of glare is self-evident, but especially it is important for all night flying, and especially for the tanker joinup. When the SR-71 is cleared again to 3.2 Mach, the problem of cooling the pilot adequately will be more acute, and the advantage of the Phase II system over the earlier system will be increased.

The comments of [] on the Phase II system are similar to those of [] and, if you wish, I will ask him to write a letter on this subject which I will forward to you.

In view of the foregoing, I think you will agree that we are neither more careless nor more brave than anyone else, and I assure you that I personally have been dedicated for many years to the problem of attaining the safest possible suits, parachutes and other pilot environmental gear that it is possible for us to buy, conceive of, or design.

Sincerely,

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